

Claims

1. A cooled furnace wall comprising a furnace shell with an inner and an outer side and cooling plates (14, 14') lining said inner side of said furnace shell; each of said cooling plates (14, 14') having a plate body (20, 20') and protruding connection pieces for supplying said cooling plate (14, 14') with a coolant, and said furnace shell having connection openings therein that make it possible to interconnect the connection pieces of adjacent cooling plates (14, 14') from the outer side of said furnace shell; **characterized in that** at least one of said connection pieces is formed by a tube bend (26, 26') that protrudes from an edge face (18, 18') of said plate body (20, 20') and that has a connection end (30, 30') extending through one of the connection openings in said furnace shell .
2. The furnace wall according to Claim 1, wherein a connection end of a tube bend connection piece of a first cooling plate is connected by means of flexible connection means to a connection end of a tube bend connection piece of an adjacent second cooling plate.
3. The furnace wall according to Claim 2, wherein: a connection box is arranged on said outer side of said furnace shell above one of said connection openings; and said connection ends (30, 30') extend into said connection box where they are interconnected by means of said flexible connection means.
4. The furnace wall according to Claim 3, wherein said connection box is sealed off by means of a removable blind flange.
5. The furnace wall according to Claim 4, wherein said connection box is dimensioned so that one of said cooling plates (14, 14') can be removed from said furnace or introduced into said furnace through said connection box.
6. The furnace wall according to Claim 5, wherein adjacent connection openings in the furnace shell are vertically offset.
7. The furnace wall according to any one of Claims 3 to 6, wherein said flexible connection means comprises a compensation tube bend which is arranged in said connection box .

8. The furnace wall according to any one of Claims 3 to 6, wherein said flexible connection means comprises a bent tube segment which is arranged in said connection box and is substantially in the shape of racing cycle handlebars.
9. The furnace wall according to any one of Claims 3 to 6, wherein said flexible
5 connection means comprises a metal hose which is arranged in said connection box where it is coupled to said connection ends (30, 30') of a pair of tube bend connection pieces (26, 26').
10. The furnace wall according to Claim 2, wherein: the connection opening in the furnace shell is covered by a socket piece which has for each connection end
10 a separate through-opening (49, 49'); and each of said connection ends (46, 46') is connected in a sealed manner to said socket piece by means of a compensator (50, 50').
11. The furnace wall according to any one of Claims 2 to 10, wherein a plate extension (36, 36') is arranged at said edge face (18, 18') of said cooling plate
15 (14, 14') in front of said connection pieces (26, 26'), so that it shields said connection pieces (26, 26') with respect to the interior of the furnace.
12. The furnace wall according to any one of Claims 2 to 10, comprising two rows of cooling plates which are arranged vertically directly above one another, the vertical joints between the cooling plates belonging to the upper row being
20 offset relative to the vertical joints between the cooling plate belonging to the lower row.
13. The furnace wall according to Claim 12, wherein said tube bend connection pieces of a cooling plates belonging to the lower row are connected to the tube bend connection pieces of two adjacent cooling plate belonging to the upper
25 row.
14. The furnace wall according to any one of Claims 1 to 13, wherein said edge face (18, 18') of the plate body (20, 20') from which said bent connection piece (26, 26') protrudes is bevelled towards said inner side of said furnace shell.
15. The furnace wall according to Claim 14, wherein said bevelled edge face (18,
30 18') forms an angle of between 105° and 135° with respect to the rear side of said cooling plate.

16. The furnace wall according to Claim 15, wherein said bevelled edge face (18, 18') forms an angle of approximately 120° with the rear side of said cooling plate.
17. The furnace wall according to Claim 14, 15 or 16, wherein for two cooling plates (14, 14') which are to be interconnected by means of said connection pieces (26, 26'), the opposite edge faces (18, 18') from which said connection pieces (26, 26') protrude are bevelled in a mirror image, so that they delimit a wedge-shaped space which narrows towards the interior of said furnace.
18. The furnace wall according to Claim 17, wherein: the plate bodies (20, 20') of said two cooling plates (14, 14') are arranged vertically directly above one another, so that an upper edge face of the lower plate body is directly facing a lower edge face of the upper plate body; and said upper edge face of the lower plate body has a nose-like projection which is bevelled parallel to said lower edge face of the upper plate body, so that said nose-like projection and said lower edge face of the upper plate body form a gap which slopes upwards towards said inner side of said furnace shell .
19. The furnace wall according to Claim 17, wherein: the plate bodies (20, 20') of said two cooling plates (14, 14') are arranged vertically directly above one another, so that an upper edge face of the lower plate body is directly facing a lower edge face of the upper plate body; and said lower edge face of the upper plate body has a nose-like projection which is bevelled parallel to said upper edge face of the lower plate body , so that said nose-like projection and said upper edge face of the lower plate body form a gap which slopes downwards towards said inner side of said furnace shell .
20. The furnace wall according to Claim 17, wherein the two bevelled edge faces (18, 18') each have a nose-like projection (70, 70') facing towards the interior of the furnace, and the two nose-like projections (70, 70') overlap.
21. The furnace wall according to any one of Claims 1 to 20, wherein said connection piece (26, 26') has at the outlet from said edge face (18, 18') a first curvature in a mid-plane of the plate body (20, 20') and thereafter a second curvature in a plane perpendicular to said mid-plane of said plate body (20, 20').

22. The furnace wall according to Claim 21, wherein said connection piece (26, 26') is composed of a 30° tube bend and a 90° tube bend, the centre lines of which lie in planes which are perpendicular to one another.
23. The furnace wall according to Claim 21 or 22, comprising two adjacent cooling plates (14, 14'), which are arranged above or next to one another in such a manner that the outlet of a connection piece in one edge face of the first cooling plate and the outlet of a connection piece in an opposite edge face of the second cooling plate lie axially opposite one another; wherein: said first curvature of a connection piece of said first cooling plate is directed in a first direction; and said first curvature of a connection piece of said second cooling plate is directed in the opposite direction.
24. The furnace wall according to Claim 23, wherein said second curvatures of said connection pieces define parallel planes of curvature and the distance between these parallel planes of curvature corresponds to 1.1 to 1.5 times the tube diameter of the bent connection pieces (26, 26').
25. The furnace wall according to Claim 23 or 24, wherein:
the opposite edge faces (18, 18') of the two plate bodies (20, 20') are bevelled in mirror-image fashion, so as to delimit a wedge-shaped space which narrows towards the interior of the furnace;
said connection end of a tube bend connection piece of the first cooling plate extends through said connection openings behind the bevelled edge face of said second cooling plate ; and
said connection end of a tube bend connection piece of said second cooling plate extends through said same connection opening behind the bevelled edge face of said first cooling plate .
26. The furnace wall according to any one of Claims 1 to 25, comprising a plug made from an elastic material that is inserted into one of said connection openings in said furnace shell.
27. The furnace wall according to Claim 26, wherein said plug has a lateral securing flange which is clamped between said cooling plates (14, 14') and said furnace shell.

28. The furnace wall according to Claim 26 or 27, wherein:
- on said outer side of said furnace shell , a connection box is arranged above said connection opening ;
- at least two connection ends (30, 30') extend through said plug into this connection box, where they are interconnected by means of flexible connection means; and
- a section of said connection box between said plug and said flexible connection means is sealed with a foamed sealing material.
29. The furnace wall according to Claim 27 or 28, wherein said connection box has a leak-test valve at its lowest point.
30. The furnace wall according to any one of Claims 1 to 29, wherein:
- a cooling plate has at least one cooling passage (22, 22') which is formed directly in a solid plate body (20, 20'); said cooling passage (22, 22') forms an opening (24, 24') in said edge face (18, 18') of said plate body (20, 20'); and
- a first end (28, 28') of said tube bend (26, 26') is inserted into said opening (24, 24') in said edge face (18, 18').
31. The furnace wall according to Claim 30, further including a turbulator (200, 200') mounted in said cooling passage (22, 22'), wherein:
- said turbulator includes a turbulator body (202, 202') and a ring-shaped fixing flange (204, 204');
- said turbulator body (202, 202') is axially inserted into said cooling passage (22, 22');
- said ring-shape fixing flange (204, 204') bears on a shoulder surface in said opening of said cooling channel; and
- said ring-shape fixing flange (204, 204') is blocked on said shoulder surface by means of said first end (28, 28') of said tube bend (26, 26') that is inserted into said opening (24, 24') in said edge face (18, 18').
32. The furnace wall according to any one of Claims 1 to 29, wherein:

a cooling plate has at least one cooling passage (22, 22') which is formed by a cast-in tube; and

at least one end of said tube protrudes from an edge face (18, 18') of said plate body (20, 20') and forms said tube bend connection piece (26, 26').